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Letters to the Editor

Microwave relaxation and association of n-octanol

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The dielectric constant ϵ' and dielectric loss ϵ'' of *n*-octanol in heptane solutions have been measured for six concentrations between 0.0082 and 0.1738 mole-fraction at wavelengths 0.22, 1.25, 3.24, 10 and 25 cm and at 6, 20, 40 and 60°C.

Also, the static dielectric constant ϵ_0 has been measured and is plotted in figure 1. The relation is not linear indicating that associates are formed and behave in the concentrated solutions in a different manner than that in the dilute solutions.

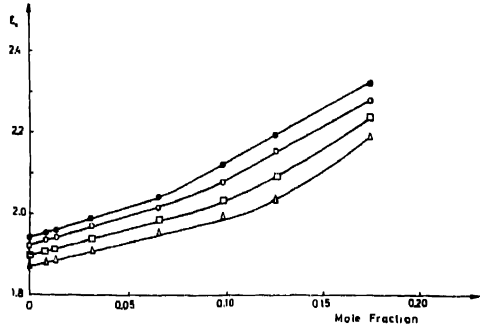

Figure 1. *n*-Octyl alcohol in heptane at ●—6°C, O—20°C, □—40°C, Δ—60°C.

Preliminary analysis of the absorption curves obtained gave three Debye terms for both dilute and concentrated solutions having relaxation times τ_1, τ_2 and τ_3 and weights G_1, G_2 and G_3.

From the dilute solutions, the short relaxation time τ_3 is found to be independent of temperature and concentration and lies around 0.6 psec and so it belongs to the rotation of the OH-group while the relaxation times τ_1 and τ_2 (around 38 and 6 psec respectively, at 20°C for the concentration 0.0082 mole-fraction) belong to the molecule as a whole. τ_1 which has a small weight G_1, results from the rotation of the long chain molecule with a dipole at the end, *i.e.* rotation around a short axis.

For the concentrated solutions, τ_3 (3.50 psec at 20°C for 0.1738 mole-fraction) is of the same order as that obtained for OH-group in pure *n*-octanol by Garg & Smyth (1965) and is temperature dependent. τ_1 (652 psec at 20°C for 0 1738 mole-fraction) is large and may be due to the rupture of hydrogen bonds inside the associated chain τ_2 (34 psec for the same concentration and temperature) has about the same value as τ_1 in the dilute solutions should be connected with the rotation of the single molecules or to the ones at the end of the associated chains. G_2 increases with the increase in temperature which demonstrates the decomposition or loosening of the association with increase in temperature

From figure 1 and the results of analysis, it is clear that associates are formed because the OH-group lies at the end of the chain and hence is subjected to intermolecular interaction, unlike the case of 3,5-dimethyl 3-hexanol (Hanna & Abdel-Nour 1970) where the associates are hardly detectable as the OH-group lies within the molecule and is shielded against the intermolecular interaction

Detailed results will be given after measuring ϵ' and ϵ'' at meter waves to subtract the contribution of the lower dispersion region from the microwave measurements for accurate evaluation of the results

The authors thank Prof M. Mokhtar for his encouragement and to Prof C. P Smyth for allowing one of us (Abdel-Nour) to take the measurements in his laboratory.

References

Garg, S. K. & Smyth, C. P 1965 *J Phys. Chem.* 69, 1294
Hanna, F. F. & Abdel-Nour, K. N. 1970 under preparation for publication.

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X-ray crystallographic data for some organic compounds

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As a part of programme for determining structures of simple organic molecules and their derivatives, we have investigated a number of molecules and the present note reports some preliminary results

1. *Potassium mesaconate* $KC_5H_5O_4$.

This is acid potassium salt of the dicarboxylic mesaconic acid $C_5H_6O_4$ with stereochemical formula;